

Patent claims

1. An arrangement for running a warehouse, in which objects are stored in a plurality of stacks in a storage area, comprising
- 5 a) a collecting device (101; 201; 501; 601), which can be moved as desired over the storage area, in particular by a portal robot,
- 10 b) an intermediate store (102; 202; 502a, 502b; 602) arranged on the collecting device (101; 201; 501; 601) to accommodate objects to be picked up from the storage area, it being possible for the intermediate store (102; 202; 502a, 502b; 602) to be filled
- 15 successively from various stacks in separate pick-up steps, and
- c) a gripping device (103; 203; 503a, 503b) arranged on the collecting device (101; 201; 501; 601) for lifting one or more objects from one of the stacks, it being possible for the gripping device (103; 203; 503a, 503b) to be moved vertically;
- 20 characterized in that
- 25 d) the gripping device (103; 203; 503a, 503b) is substantially formed by two mutually opposite blades (104, 105; 204, 205; 504a, 504b, 505a, 505b; 604, 605).
- 30 2. The arrangement as claimed in claim 1, characterized in that the collecting device (101; 201; 601) is divided into two mutually opposite halves which can be moved relative to each other.
- 35 3. The arrangement as claimed in claim 1 or 2, characterized in that the intermediate store (102; 502a, 502b; 602) is substantially formed by two

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mutually opposite side beams (108, 109; 508, 509; 608, 609).

4. The arrangement as claimed in claim 3,
5 characterized in that the blades (104, 105; 504a, 504b, 505a, 505b; 604, 605) of the gripping device (103; 503a, 503b) are mounted in the side beams (108, 109; 508, 509; 608, 609) of the intermediate store (102; 502a, 502b; 602) such that they can be
10 moved vertically.
5. The arrangement as claimed in claim 4,
characterized in that vertical planes which are
15 defined by the blades (204, 205) and by the side beams (208, 209) of the intermediate store enclose a space with a substantially rectangular cross section.
6. The arrangement as claimed in one of claims 1 to
20 5, characterized in that the blades (104, 105; 204, 205; 504a, 504b, 505a, 505b) comprise on an inner side holding elements (119; 219; 519) for holding the objects and/or securing elements (118; 518) for securing the objects against horizontal
25 movements relative to the gripping device and/or tilting.
7. The arrangement as claimed in one of claims 1 to
30 6, characterized in that the intermediate store (102; 202; 502a, 502b; 602) is arranged in a fixed location above the storage area as the objects are picked up.
8. The arrangement as claimed in one of claims 1 to
35 7, characterized in that the intermediate store (102) comprises at its upper end a vertically movable element (131) which exerts a force

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downward on the topmost stored object in order to stabilize the stored stack.

- 5 9. The arrangement as claimed in one of claims 1 to 8, characterized in that the intermediate store (102; 202) comprises holding elements (130; 237) for holding the stored objects and/or securing elements (120) for securing the objects against horizontal movements relative to the intermediate store (102; 202) and/or tilting.
- 10 10. The arrangement as claimed in one of claims 1 to 9, characterized in that the intermediate store (102; 502a, 502b) comprises, preferably at its lower end, a calibration part (110; 510) which corrects an orientation of the objects as they are inserted into the intermediate store (102; 502a, 502b).
- 15 11. The arrangement as claimed in claim 10, characterized in that the calibration part (110) is formed by two C-shaped adjusting elements (111, 112).
- 20 12. The arrangement as claimed in one of claims 1 to 11, characterized in that a collecting device (501) comprises a plurality of intermediate stores (502a, 502b).
- 25 13. The arrangement, in particular as claimed in one of claims 1 to 12, for running a warehouse, in which objects are stored in a plurality of stacks in a storage area, comprising
- 30 a) a collecting device (601), which can be moved as desired over the storage area, in particular by a portal robot,
- 35 b) an intermediate store (602) arranged on the collecting device (601) to accommodate

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- objects to be picked up from the storage area, it being possible for the intermediate store (602) to be filled successively from various stacks in separate pickup steps, and
- 5 c) a gripping device (604, 605) arranged on the collecting device (601) for lifting one or more objects from one of the stacks, it being possible for the gripping device (604, 605) to be moved vertically;
- 10 characterized by
- d) a storage unit (649.1...649.6), which can be moved independently of the collecting device (601) and which is constructed in such a way that objects accommodated in the intermediate
- 15 store (602) of the collecting device (601) can be transferred directly into the storage unit (649.1...649.6).
14. The arrangement as claimed in claim 13, characterized in that the storage unit (649.1...649.6) is substantially C-shaped with a base part (650) running vertically and arranged at the rear, and two holding parts (651, 652) held on the base part (650), arranged centrally and
- 20 projecting forward, between which the objects can be picked up.
15. The arrangement as claimed in claim 13 or 14, characterized in that a plurality of storage units (649.1...649.6) are preferably fixedly arranged on a portal bridge (647), and in that the collecting device (601) is arranged such that it can be moved on a further portal bridge (641), the storage units (649.1...649.6) and the collecting device
- 30 (601) being located opposite each other.
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16. A method for operating a warehouse, in which objects are stored in a plurality of stacks in a storage area, in which

- 5 a) a collecting device (101; 201; 401; 501; 601) is moved over the storage area to any desired stack having objects to be picked up;
- 10 b) a gripping device (103; 203; 403; 503a, 503b; 604, 605) arranged on the collecting device (101; 201; 401; 501; 601) for picking up a stack part from one or more objects of the stack is moved vertically downward;
- 15 c) the stack part is gripped by two mutually opposite blades (104, 105; 204, 205; 404, 405; 604, 605) of the gripping device (103; 203; 403; 503a, 503b);
- 20 d) the gripping device (103; 203; 403; 503a, 503b) is moved vertically upward, so that an intermediate store (102; 202; 402; 502a, 502b; 602) arranged on the collecting device (101; 201; 401; 501; 601) accommodates the
- 25 objects picked up from the storage area; and
- e) the intermediate store (102; 202; 402; 502a, 502b; 602) is filled successively from various stacks in further pick-up steps.

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17. The method as claimed in claim 16, characterized in that, in order to pick up the stack part, the two mutually opposite blades (104, 105; 204, 205; 404, 405; 504a, 504b, 505a, 505b; 604, 605) are

35 extended out of the collecting device (101; 201; 401; 501; 601), the intermediate store (102; 202; 402; 502a, 502b; 602) remaining in a fixed location.

18. The method as claimed in claim 16 or 17, characterized in that, during the movement of the collecting device (101), the objects in the intermediate store (102) are secured against horizontal movements relative to the collecting device (101) and /or tilting by securing elements (120) of the intermediate store (102).
19. The method as claimed in one of claims 16 to 18, characterized in that the objects gripped by the gripping device (103; 503a, 503b), as they move upward, are secured against horizontal movements relative to the gripping device (103; 503, 503b) and/or tilting by securing elements (118; 518) of the gripping device (103; 503a, 503b).
20. The method as claimed in one of claims 16 to 19, characterized in that, in order to grip the stack part, two mutually opposite halves of a collecting device are moved toward each other until the blades hold the stack part with a form or force fit.
21. The method, in particular as claimed in one of claims 16 to 20, for running in a warehouse, in which objects are stored in a plurality of stacks in a storage area, in which
- a) a collecting device (601) is moved over the storage area to any desired stack having objects to be picked up;
 - b) a stack part of one or more objects from the stack is accommodated in an intermediate store (602) of the collecting device (601);

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- c) the intermediate store (602) is filled successively from various stacks in further pick-up steps; and
- 5 d) the objects accommodated in the intermediate store (602) are transferred to a storage unit (649.1...649.6) which can be moved independently of the collecting device (601).